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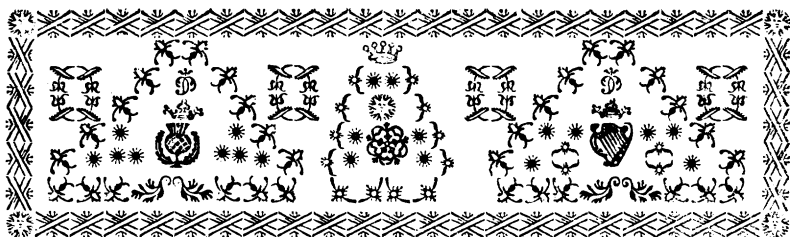
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TRANSACTIONS

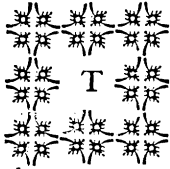
O F T H E

American PHILOSOPHICAL SOCIETY, &c.

S E C T. I.

MATHEMATICAL *and* ASTRONOMICAL PAPERS.

A description of a new ORRERY, planned, and now nearly finished, by David Rittenhouse, A M. of Norriton, in the county of Philadelphia. Communicated by Dr. SMITH.


 HIS *machine* is intended to have three *faces*, standing perpendicular to the horizon : That in the front to be four feet square, made of sheet brass, curiously polished, silvered and painted in proper places, and otherwise ornamented. From the center arises an axis, to support a gilded brass ball, intended to represent the *sun*. Round this ball move others, made of brass or ivory, to represent the *planets* : They are to move in elliptical orbits, having the central ball in one focus ; and their motions to be sometimes swifter, and sometimes slower, as nearly according to the true law of an equable description of areas as is possible, without too great a complication of wheel-work. The orbit of each planet is likewise to be

A

properly

properly inclined to those of the others; and their *Aphelia* and *Nodes* justly placed; and their velocities so accurately adjusted, as not to differ sensibly from the tables of astronomy in some thousands of years.

FOR the greater beauty of the instrument, the balls representing the planets, are to be of a considerable bigness; but so contrived, that they may be taken off at pleasure, and others, much smaller, and fitter for some purposes, put in their places.

WHEN the machine is put in motion, by the turning of a winch, there are three indexes, which point out the hour of the day, the day of the month, and the year, (according to the *Julian* account) answering to that situation of the heavenly bodies which it then represented; and so continually, for a period of 5000 years, either forward or backward.

IN order to know the true situation of a planet, at any particular time, the small set of balls are to be put each on its respective axis, then the winch to be turned round 'till each index points to the given time; then a small *Telescope*, made for the purpose, is to be applied to the central ball, and directing it to the planet, its longitude and inclination will be seen on a large brass circle, silvered, and properly graduated, representing the *Zodiac*, and having a motion of one degree in 72 years, agreeable to the precession of the *Equinoxes*: So likewise by applying the telescope to the ball representing the *Earth*, and directing it to any planet, then will both the longitude and latitude of that planet be pointed out (by an index, and graduated circle) as seen from the earth.

THE two lesser *Faces* are four feet in height, and 2 feet 3 inches in breadth: One of them represents and exhibits all the appearances of *Jupiter*, and his satellites, their eclipses, transits and inclinations: Likewise all the appearances of *Saturn*, with his ring and satellites. And the other represents all the phenomena of the *Moon*, particularly the exact time, quantity, and duration of her eclipses, and those of the
Sun,

Sun, occasioned by her interposition; with a most curious contrivance for exhibiting the appearance of a *Solar Eclipse* at any particular place on the earth: Likewise the true place of the *Moon* in the signs, with her latitude, and the place of her *Apogee* and *Nodes*, the *Sun's* declination, equation of time, &c. It must be understood that all these motions are to correspond exactly with the celestial motions, and not to differ some *Degrees* from the truth, as is common in orreries.

THE whole may be adjusted to, and kept in motion by, a strong *Pendulum Clock*, nevertheless, at liberty to be turned by the winch, and adjusted to any time, past or future.

N. B. THE above machine is to be supported by a mahogany case, adorned with foliage, and some of the best enrichments of sculpture. The part containing the mechanical astronomy of the *Moon*, has been sometime finished, and is found perfectly to answer, by many trials already made of it. The remainder of the work, is now almost compleated. The clock part of it may be contrived to play a great variety of *Music*.